

REMARKS

Claims 8-11, 18-19, 21 and 22 were examined. Claims 8 and 18 are amended. Claim 24 is added. Claims 8-11, 18-19 and 24 remain in the Application.

The Patent Office objects to the Amendment and Response to Office Action filed July 13, 2005 as not fully responsive. The Patent Office believes the pending claims are drawn to a non-elected invention and points to Figure 4a as the elected invention. Reconsideration of the pending claims is respectively requested in view of the above amendments and the following remarks.

A. 35 U.S.C. §102(e): Rejection of Claims 8, 18-19 & 21-22

In an Office Action dated May 13, 2005, the Patent Office rejects claims 8, 18-19 and 21-22 under 35 U.S.C. §102(e) as anticipated by U.S. Patent No. 6,252,776 of Saito et al. (Saito). I

Independent claim 8 describes an apparatus comprising a heat spreader comprising heat conductive material and a contiguous wall structure extending from a surface of the heat spreader; a package substrate; a flexible material in contact with the surface of the heat spreader and the package substrate, the flexible material defining a perimeter of a cavity; and a circuit substrate disposed within the cavity. Support for a flexible material coupled to the surface of the heat spreader and the substrate may be found in Figure 4a of the Application.

Claim 8 is not anticipated by Saito, because Saito does not disclose a flexible material in contact with the surface of a heat spreader and the package substrate, wherein the heat-spreader comprises a wall structure extending from the surface. Saito describes heat conducting rubber 6 between printed board 2 and protrusions on radiator 11. The heat conducting rubber does not extend between a surface of radiator 11 from which the protrusions extend and printed board 2.

Independent claim 18 describes a semiconductor package comprising a substrate; at least one semiconductor device coupled to a top surface of the substrate; a cover; and a thermal interface material comprising metal particles disposed between a surface of a semiconductor device and the cover. The cover comprises a contiguous attachment structure extending from the surface and a flexible material contacting a surface of the cover and a surface of the substrate.

Claim 18 is not anticipated by Saito, because Saito does not describe a flexible material contacting a surface of a cover and a surface of a substrate.

Claim 19 depends from claim 18 and therefore contains all the limitations of that claim. For at least the reason stated with respect to claim 18, claim 19 is not anticipated by Saito.

Applicant respectfully requests that the Patent Office withdrawn the rejection to claims 8 and 18-19 under 35 U.S.C. §102(e).

B. 35 U.S.C. §102(b): Rejection of Claims 8, 18-19 & 21-22

In the Office Action dated May 13, 2005, the Patent Office rejects claims 8, 18-19 and 21-22 under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 5,175,613 of Barker III, et al. (Barker). Barker discloses heat sink 14 connected to a substrate including peripheral rim or flange 36 connected to the substrate through compliant conductive layer or strip 26.

Claim 8 is not anticipated by Barker, because Barker does not disclose an apparatus including a flexible material in contact with a surface of a heat spreader and a package substrate. With reference to Figure 2 of Barker, Barker describes compliant conductive layer 26 between rim 36 of heat sink 14 and wiring board 16. Conductive layer 26 does not contact top surface 54 from which rim 36 protrudes.

Claims 18-19 are also not anticipated by Barker, because Barker does not disclose a flexible material contacting a surface of a cover and a surface of a substrate.

For the above stated reasons, Applicant respectfully requests that the Patent Office withdraw the rejection to claims 8 and 18-19 under 35 U.S.C. §102(b).

C. 35 U.S.C. §103(a): Rejection of Claims 8-11, 18-19 & 21-22

The Patent Office rejects claims 8-11, 18-19 and 21-22 under 35 U.S.C. §103(a) as obvious over U.S. Patent No. 5,931,222 of Toy et al. (Toy) in view of Barker. Barker is cited for teaching connecting a heat spreader to a substrate using a compliant flexible material. Toy is cited for disclosing a nickel-plated heat spreader.

Claims 8-11 are not obvious over the cited references, because the cited references do not describe an apparatus including a flexible material coupled to a surface of a heat spreader and a package substrate. Referring to Figure 1 of Toy, Toy shows solder 23 and seal band 24 connecting cap 18 to lower substrate 11. Solder 23 and seal band 24 do not extend from a surface of lower substrate 11 to a surface of cap 18, the same surface between which, thermal paste 16 contacts the surface and a surface of chip 12. Barker similarly does not disclose compliant conductive layer 26 contacting similar surfaces.

Claims 18-19 are not obvious over the cited references, because the references fail to disclose or provide any motivation for a semiconductor package including a flexible material contacting a surface of a cover and a top surface of a substrate. In this regard, the arguments presented above with respect to claims 8-11 are applicable here.

Applicant respectfully requests that the Patent Office withdraw the rejection to claims 8-11 and 18-19 under 35 U.S.C. §103(a).

D. New Claim 24

Claim 24 is added as a dependent claim from claim 8. Support for a thermal interface material as described may be found in the Application at, for example, page 9, lines 14-16 referencing thermal interface material 305a containing metal particles 306a. These materials included in Figure 4a.

CONCLUSION

In view of the foregoing, it is believed that all claims now pending patentably define the subject invention over the prior art of record and are in condition for allowance, and such action is earnestly solicited at the earliest possible date. If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly, extension of time fees. If a telephone interview would expedite the prosecution of this Application, the Examiner is invited to contact the undersigned at (310) 207-3800.

Respectfully submitted,

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Nedy Calderon 11/7/05
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